

IN THE CLAIMS:

Claims 1-3, 5, 7, 9, 11, 13, 16-19, 24-28, 30, 32, 34, 35, 38, 40, 41, 43, 51-53, 57, 59, 61, 63, 66-69, 74-76, 78, 81, 85, 87, and 88 have been amended herein. Please note that all claims currently pending and under consideration in the referenced application are shown below, in clean form, for clarity. Please enter these claims as amended. Also attached is a version with markings to show changes made to the claims.

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1. (Twice Amended) A method of molding a semiconductor assembly comprising:
providing a transfer mold having an inner surface defining at least one mold cavity;
providing at least one semiconductor substrate having at least one surface with conductive elements thereon and a back surface thereof;
positioning said at least one semiconductor substrate in said at least one mold cavity of said transfer mold so that portions of said inner surface of said transfer mold abut with said conductive elements of said at least one surface of said at least one semiconductor substrate and another portion of said inner surface abuts with said back surface of said at least one semiconductor substrate; and
introducing a flowable material onto said at least one surface of said at least one semiconductor substrate in a substantially vertical direction in said at least one mold cavity so that said flowable material flows around said portions of said inner surface of said transfer mold abutting with said conductive elements on said at least one surface of said at least one semiconductor substrate.

2. (Twice Amended) The method according to claim 1, wherein said providing said transfer mold comprises configuring said transfer mold so that said at least one cavity is substantially vertically oriented with at least one gate at a lower portion of the transfer mold and at least one vent at an upper portion of the transfer mold.

3. (Amended) The method according to claim 2, wherein said introducing said flowable material comprises:
substantially filling said at least one cavity in said substantially vertical direction.

4. (Previously Amended) The method according to claim 3, wherein said substantially filling said at least one cavity comprises:
introducing said flowable material through said at least one gate until a single flow front of said flowable material contacts said at least one vent at said upper portion of said at least one cavity.

5. (Amended) The method according to claim 2, wherein said positioning said at least one substrate further comprises:
positioning said at least one semiconductor substrate substantially vertically.

6. (Previously Amended) The method according to claim 5, wherein said introducing said flowable material comprises:
filling said at least one cavity until a single flow front of said flowable material contacts said at least one vent.

7. (Amended) The method according to claim 6, wherein said filling said at least one cavity with said flowable material comprises:
at least partially encapsulating said at least one semiconductor substrate.

8. The method according to claim 1, wherein said introducing said flowable material in said substantially vertical direction comprises:
inducing a substantially uniform flow front.

9. (Amended) The method according to claim 1, wherein said introducing said flowable material comprises introducing said flowable material onto a substantially vertically oriented surface of said at least one semiconductor substrate.

10. (Previously Amended) The method according to claim 1, wherein said introducing said flowable material onto said at least one surface of said at least one substrate in said substantially vertical direction comprises:
substantially preventing voids in said flowable material.

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11. (Amended) The method according to claim 1, wherein said providing said at least one substrate comprises:
providing an assembly including said at least one semiconductor substrate.

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13. (Twice Amended) The method according to claim 11, wherein said providing said assembly comprises:
providing said assembly with said at least one semiconductor substrate comprising at least one semiconductor die having bond pads thereon, said at least one semiconductor die including conductive structures protruding from said bond pads.

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16. (Amended) The method according to claim 1, wherein said providing said at least one semiconductor substrate comprises:
providing at least one individual semiconductor die.

17. (Twice Amended) The method according to claim 16, wherein said providing said at least one individual semiconductor die comprises:
providing said at least one individual semiconductor die with conductive structures protruding therefrom to abut with said portions of said at least one cavity.

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18. (Twice Amended) The method according to claim 1, wherein said providing said at least one semiconductor substrate comprises:
providing a large-scale semiconductor substrate.

19. (Twice Amended) The method according to claim 18, wherein said providing said large-scale semiconductor substrate comprises:
providing a plurality of semiconductor dice interconnected to each other, each of said plurality comprising at least one of bond pads and conductive structures protruding from said bond pads.

20. The method according to claim 18, wherein said providing said large-scale substrate comprises:
providing at least a portion of a wafer.

21. (Previously Amended) The method according to claim 1, wherein said introducing said flowable material includes capillary action acting on said flowable material.

22. (Previously Amended) The method according to claim 1, wherein said introducing said flowable material includes positive pressure acting on said flowable material.

23. (Previously Amended) The method according to claim 1, wherein said introducing said flowable material includes negative pressure acting on said flowable material.

24. (Amended) The method according to claim 1, wherein said providing said transfer mold comprises configuring said portions of said inner surface of said transfer mold to comprise protrusions to abut with said conductive element on said at least one surface of said at least one semiconductor substrate so that said flowable material partially covers said at least one surface of said at least one semiconductor substrate.

25. (Amended) The method according to claim 1, wherein said providing said at least one semiconductor substrate comprises providing said at least one semiconductor substrate having said at least one surface with conductive structures protruding therefrom, and wherein said providing said transfer mold comprises configuring each portion of said portions of said inner surface of said transfer mold to comprise a recess to at least partially receive a corresponding one of said conductive structures so that said flowable material partially covers said conductive structures.

26. (Amended) A method of molding a semiconductor assembly comprising:
providing a transfer mold having an inner surface defining at least one mold cavity;
providing an assembly including at least one semiconductor device attached face down to a carrier substrate with conductive structures providing an assembly gap therebetween;

positioning said assembly in said at least one mold cavity of said transfer mold so that said carrier substrate abuts with a first inner surface of said transfer mold to provide an outer gap between a back surface of said at least one semiconductor device and an opposing second inner surface of said transfer mold; and introducing a flowable material onto at least one surface of said assembly to flow through said assembly gap and said outer gap in an upward, substantially vertical direction in said at least one mold cavity.

27. (Twice Amended) The method according to claim 26, wherein said providing said transfer mold comprises configuring said transfer mold so that said at least one cavity is substantially vertically oriented with at least one gate at a lower portion of the transfer mold and at least one vent at an upper portion of the transfer mold.

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28. (Amended) The method according to claim 27, wherein said introducing said flowable material comprises:
substantially filling said at least one cavity in said upward, substantially vertical direction.

29. (Previously Amended) The method according to claim 28, wherein said substantially filling said at least one cavity comprises:
introducing said flowable material through said at least one gate until a single flow front of said flowable material contacts said at least one vent at said upper portion of said at least one cavity.

30. (Amended) The method according to claim 27, wherein said positioning said assembly further comprises:
positioning said assembly substantially vertically.

31. (Previously Amended) The method according to claim 30, wherein said introducing said flowable material comprises:
filling said at least one cavity until a single flow front of said flowable material contacts said at least one vent.

32. (Amended) The method according to claim 31, wherein said filling said at least one cavity with said flowable material comprises:
encapsulating said assembly so that said flowable material fills said assembly gap and said outer gap.

33. (Previously Amended) The method according to claim 26, wherein said introducing said flowable material in said upward, substantially vertical direction comprises:
inducing a substantially uniform flow front.

34. (Twice Amended) The method according to claim 26, wherein said introducing said flowable material comprises said flowable material to flow substantially across said at least one surface of said assembly.

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35. (Twice Amended) The method according to claim 26, wherein said introducing said flowable material onto said at least one surface of said assembly in said upward, substantially vertical direction comprises substantially preventing voids in said flowable material.

38. (Twice Amended) The method according to claim 26, wherein said providing said assembly comprises:
providing said assembly with said at least one semiconductor device connected to an interposer.

40. (Twice Amended) The method according to claim 26, wherein said introducing said flowable material comprises:
introducing said flowable material to flow between said at least one semiconductor device and said carrier substrate.

41. (Amended) The method according to claim 26, wherein said providing said assembly comprises:
providing at least one individual semiconductor die.

43. (Twice Amended) The method according to claim 26, wherein said providing said assembly comprises:
providing a large-scale substrate including a plurality of semiconductor devices attached face down thereto.

44. (Previously Amended) The method according to claim 43, wherein said providing said large-scale substrate comprises:
providing said large-scale substrate having said conductive structures protruding from bond pads of said plurality of semiconductor devices.

46. (Previously Amended) The method according to claim 26, wherein said introducing said flowable material includes capillary action on said flowable material.

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47. (Previously Amended) The method according to claim 26, wherein said introducing said flowable material includes positive pressure on said flowable material.

48. (Previously Amended) The method according to claim 26, wherein said introducing said flowable material includes negative pressure on said flowable material.

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51. (Twice Amended) A method for encapsulating a substrate that substantially prevents voids in an encapsulant, the method comprising:
providing a transfer mold having an inner surface defining at least one mold cavity;
providing at least one semiconductor substrate having at least one surface with conductive elements thereon and a back surface thereof;
positioning said at least one semiconductor substrate in said at least one mold cavity of said transfer mold so that portions of said inner surface of said transfer mold abut with said conductive elements of said at least one surface of said at least one semiconductor substrate and another portion of said inner surface abuts with said back surface of said at least one semiconductor substrate; and
introducing a flowable material onto at least one surface of said at least one substrate in an upward, non-horizontal direction in said at least one mold cavity so that said flowable

material flows around said portions of said inner surface of said transfer mold abutting with said conductive elements on said at least one surface of said at least one substrate.

52. (Amended) The method according to claim 51, wherein said providing said transfer mold comprises configuring said transfer mold so that said at least one cavity is non-horizontally oriented with at least one gate at a lower portion of the transfer mold and at least one vent at an upper portion of the transfer mold.

53. (Amended) The method according to claim 52, wherein said introducing said flowable material comprises:
substantially filling said at least one cavity in a non-horizontal direction.

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54. (Previously Amended) The method according to claim 53, wherein said substantially filling said at least one cavity comprises:
introducing said flowable material through said at least one gate until a single flow front of said flowable material contacts said at least one vent at said upper portion of said at least one cavity.

55. The method according to claim 52, wherein said positioning said at least one substrate further comprises:
positioning said at least one substrate substantially vertically.

56. (Previously Amended) The method according to claim 55, wherein said introducing said flowable material comprises:
filling said at least one cavity until a single flow front of said flowable material contacts said at least one vent.

57. (Amended) The method according to claim 56, wherein said filling said at least one cavity with said flowable material comprises:
at least partially encapsulating said at least one substrate.

58. (Previously Amended) The method according to claim 51, wherein said introducing said flowable material in said upward, non-horizontal direction comprises:
inducing a substantially uniform flow front.

59. (Twice Amended) The method according to claim 51, wherein said introducing said flowable material comprises permitting said flowable material to flow onto a substantially vertically oriented surface of said at least one semiconductor substrate.

60. (Previously Amended) The method according to claim 51, wherein said introducing said flowable material onto at least one surface of said at least one substrate in said upward, non-horizontal direction comprises:
substantially preventing voids in said flowable material.

61. (Amended) The method according to claim 51, wherein said providing said at least one substrate comprises:
providing an assembly including said at least one semiconductor substrate.

63. (Twice Amended) The method according to claim 61, wherein said providing said assembly comprises:
providing said assembly with said at least one semiconductor substrate including at least one semiconductor die having bond pads thereon, said at least one semiconductor die including conductive structures protruding from said bond pads.

66. (Amended) The method according to claim 51, wherein said providing said at least one semiconductor substrate comprises:
providing at least one individual semiconductor die.

67. (Twice Amended) The method according to claim 66, wherein said providing said at least one individual semiconductor die comprises:
providing said at least one individual semiconductor die with conductive structures protruding therefrom to abut with said portions of said at least one cavity.

68. (Twice Amended) The method according to claim 51, wherein said providing said at least one semiconductor substrate comprises:
providing a large-scale semiconductor substrate.

69. (Twice Amended) The method according to claim 68, wherein said providing said large-scale semiconductor substrate comprises:
providing a plurality of semiconductor dice interconnected to each other, each of said plurality comprising at least one of bond pads and conductive structures protruding from said bond pads.

70. The method according to claim 68, wherein said providing said large-scale substrate comprises:
providing at least a portion of a wafer.

71. (Previously Amended) The method according to claim 51, wherein said introducing said flowable material includes capillary action acting on said flowable material.

72. (Previously Amended) The method according to claim 51, wherein said introducing said flowable material includes positive pressure on said flowable material.

73. (Previously Amended) The method according to claim 51, wherein said introducing said flowable material includes negative pressure on said flowable material.

74. (Amended) The method according to claim 51, said providing said transfer mold comprises configuring said portions of said inner surface of said transfer mold to comprise protrusions to abut with said conductive element on said at least one surface of said at least one semiconductor substrate so that said flowable material partially covers said at least one surface of said at least one semiconductor substrate.

75. (Twice Amended) The method according to claim 51, wherein said providing said at least one semiconductor substrate comprises providing said at least one semiconductor substrate

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having said at least one surface with conductive structures protruding therefrom, and wherein said providing said transfer mold comprises configuring each portion of said portions of said inner surface of said transfer mold to comprise a recess to at least partially receive a corresponding one of said conductive structures so that said flowable material partially covers said conductive structures.

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76. (Amended) A method for transfer molding a semiconductor assembly comprising: providing at least one transfer mold having an inner surface defining at least one cavity, said at least one transfer mold including at least one gate at a lower portion thereof and at least one vent at an upper portion thereof; providing an assembly including at least one semiconductor device attached face down to a carrier substrate with conductive structures providing an assembly gap therebetween; positioning said assembly in said at least one mold cavity of said transfer mold so that said carrier substrate abuts with a first inner surface of said transfer mold to provide an outer gap between a back surface of said at least one semiconductor device and an opposing second inner surface of said transfer mold; and introducing a resin material into said at least one cavity through said at least one gate so that said resin material moves upwardly over said assembly and through said assembly gap and said outer gap in a non-horizontal direction.

77. (Previously Amended) The method according to claim 76, comprising: removing substantially all gas within said at least one cavity therefrom through said at least one vent during said introducing said resin material.

78. (Twice Amended) The method according to claim 76, wherein said introducing said resin material comprises: at least partially encapsulating said assembly.

79. (Previously Amended) The method according to claim 76, wherein said providing said at least one transfer mold comprises:
providing said at least one transfer mold with said at least one cavity being oriented non-horizontally.

80. (Previously Amended) The method according to claim 76, wherein said providing said at least one transfer mold comprises:
providing said at least one transfer mold with said at least one cavity being substantially vertically oriented.

81. (Twice Amended) The method according to claim 76, wherein said introducing said resin material includes a single, substantially uniform flow front around said assembly.

82. (Previously Amended) The method according to claim 76, wherein said introducing said resin material includes introducing said resin material until a single, substantially uniform flow front of said resin material contacts said at least one vent at said upper portion of said at least one cavity.

85. (Twice Amended) The method according to claim 76, wherein said providing said assembly comprises:
providing a flip-chip type semiconductor device.

87. (Twice Amended) The method according to claim 76, wherein said introducing said resin material comprises:
introducing said resin material to flow between said semiconductor device and said carrier substrate.

88. (Twice Amended) The method according to claim 87, wherein said introducing said resin material further comprises:
at least partially encapsulating at least one of said semiconductor device and said carrier substrate.